

To: Seter, David[Seter.David@epa.gov]
Cc: Dietrick McGinnis[dmcginnis@mcginnisandassociates.com]
From: Earle Dixon
Sent: Mon 1/15/2018 5:28:31 PM
Subject: RE: Anaconda Plume Stability

Hi Dave,

Thank you for these interesting plots. Do we need to view the MK "S statistic" value to help interpret the P value given in the plots? Can we get the MK run data tables for these plots? If not for the linear trend plot, P values of <0.01 can still indicate the original Hypothesis is rejected, but without the negative or positive S value, one can't tell if the trend is increasing or decreasing?

These limited plots for the Intermediate Zone suggest more increasing trends than decreasing trends? Interesting observation to contrast with the ARC interpretation that the plume is chemically "stable." Sometimes the U level goes up with rise in SWL elevation, and sometimes it looks like it goes down. The impact of dilution or mobilization due to recharge appears to be a complexing factor. Most well trends and P values near the various ponds indicate these features continue to supply source term to the groundwater (more than 8 of the 16 wells display an increasing trend).

Similar behavior in the Shallow Zone, but so many wells to link up with the map of well locations and conceptualize. Recharge events or the flux in the SWL elevation correlates with the uranium level dramatically in many wells.

Maybe for now, a graphical analysis of the presumed major groundwater flow paths is all we can do because the determination of consistent flow paths over the life of the plume to date is too complex given the seasonal and variable pumping rate of offsite domestic and irrigation wells?

Thanks,

Earle

From: Seter, David [mailto:Seter.David@epa.gov]
Sent: Thursday, January 11, 2018 11:41 AM
To: Ginny Marie <ghatch@ypt-nsn.gov>; wrptgapmanager@gmail.com; Dietrick McGinnis <dmcginnis@mcginnisandassociates.com>; Sarah Peters <speters@mcginnisandassociates.com>; Earle Dixon <edixon@mcginnisandassociates.com>; Rodriguez, Dante <Rodriguez.Dante@epa.gov>
Subject: Anaconda Plume Stability

Dear Ginny, Tashina, McGinnis team, and Dante,

I thought I would briefly bring you up to speed on EPA's independent efforts to get a handle on plume stability re the Anaconda Copper Mine Site.

EPA has been testing an open source software tool used to analyze and report trends in groundwater quality monitoring data, aka a tool called "Groundwater Spatiotemporal Data Analysis Tool (GWSDAT)" available at:

<https://www.claire.co.uk/projects-and-initiatives/gwsdat>

EPA tasked its contractor APTIM with taking the ARC groundwater data base and creating an excel file that could be input into the software tool. While the tool is capable of generating a visual interpretation of the change in plume size and shape over time, we found that the years of record are insufficient to make this aspect of the software tool particularly useful. However, another aspect of the tool is that it quickly generates trends analysis for individual wells using a variety of statistical methods. The attached pdf files show the results of such a data run. For this aspect of the tool to be useful in assessing plume stability, trends for wells located along flow paths would need to be assessed. This means determining which flow paths, if any, remain more or less consistent over the years of record.

EPA has not yet determined the level of effort we will be able to dedicate to plume stability analysis of this nature but we thought we would provide this update to share our thoughts on what might be possible and to hear your thoughts on next steps. We have not yet shared these

results with ARC or other stakeholders as we consider this effort in the developmental phase.

Best Regards,

David A. Seter, P.E.

Remedial Project Manager

USEPA Region 9

Superfund Division (SFD-8-2)

75 Hawthorne Street

San Francisco, CA 94105

415-972-3250